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the herpetological fauna of Eastern Africa whenever a thorough search can be made."

The collection includes thirty-four species, of which twenty are lizards, twelve are snakes, and two are batrachians. Two plates, admirably drawn, accompany the paper, giving in detail the curious appearance of the three new species.

The other papers contain a description of a new snake (*Atractaspis leucura*) from Assinie;¹⁷ a review of the genus *Heterolepis*, with the addition to it of three new species,—*H. stenophthalmus*, *H. guiralii*, *H. savorgnanii*;¹⁸ and descriptions of snakes¹⁹ and reptiles²⁰ from the Congo country.

Of the latter, M. Mocquard described thirty-four species, four of which are new,—*Microsoma fulvicollis*, *Coronella longicauda*, *Atheris anisolepis*, and *Gonionotus brussauxii*.

EMBRYOLOGY.¹

Development of Compound Ascidians.—Dr. M. v. Davidoff has published a second contribution to the above subject, entitled "Untersuchungen zur Entwicklungsgeschichte der *Distaplia magnilarva*, etc."² He deals here with the general formation of the germ-layers. The paper runs through more than a hundred pages, and the author by no means confines himself to the title of the paper, but discusses the development of all other Ascidians, the problem of the mesoderm formation, and touches upon the origin of the vertebrates themselves. The holoblastic segmentation of the egg is described for the earlier stages. The most interesting fact in this connection is the presence of the *test cells* between the segments of the egg for quite a long time during the early stages. Subsequently they disappear, presumably degenerating. A solid mass of cells results from the segmen-

¹⁷ Sur une nouvelle espèce d'*Atractaspis* (*A. leucura*). Ext. Bull. de la Société Philomathique de Paris Séance du 28 Novembre, 1885.

¹⁸ Du genre *Heterolepis* et des espèces qui le composent dont trois nouvelles. Ext. Bull. de la Société Philomathique de Paris, October, 1886.

¹⁹ Sur les Ophidiens rapportés du Congo par la Mission du Brazza. Ext. du Bull. Soc. Philomathique de Paris. Séance du 18 Dec., 1886.

²⁰ Sur une Collection de Reptiles du Congo. Ext. Bull. de la Soc. Philomathique de la Paris, 8 série, t. 1, No. 4, page 143.

¹ Edited by Dr. T. H. Morgan, Johns Hopkins University, Baltimore, Md.

² Naples Mittheilungen, IX. Band, IV. Heft.

tation, those over one pole being very large, and are, as shown by their fate, the endoderm cells, while those at the other pole go to form the ectoderm. Both germ-layers are filled with large yolk masses. The ectoderm cells partially surround the endoderm cells. Where ectoderm and endoderm come in contact around the periphery of the large, open blastopore there is found a ring of small ectoderm cells, which go to form the nerve-chord of the older larva. It is thus seen that the nerve-chord is formed from two bilateral parts lying along each side of the blastopore, then subsequently coming into contact form the nerve plate. Before the blastopore is closed in, however, the large endoderm cells, which are still at the surface (within the rim of the ectoderm forming the blastopore lips) delaminate into a row of outer, smaller cells—the endodermal plate—and larger cells in the interior of the embryo. From the former there develops, at the sides of the blastopore, the peristomial mesoderm. Later, as said above, the lips of the blastopore close over the endodermal plate, and the nerve-chord is formed out of the cells from the two sides of the blastopore meeting over the endodermal plate. *It is thus seen that the blastopore corresponds to the dorsal side of the embryo.* In other words, the animal pole of the eggs, where the ectoderm first forms, corresponds to the ventral side of the Ascidian, and by inference to the ventral side of all Chordata. (Van Beneden had previously pointed out this fact, which is of the greatest importance, since it bears directly upon two of the most interesting problems of embryology,—viz., the relation of vertebrates to other groups, and the polar relations of the egg to the adult animal.) There is no invaginate gastrula in Distaplia, and the cavity of the digestive tract appears later as a split in the endoderm. After a review of gastrula within the group, the author concludes as follows: “Segmentation in the *solitary* Ascidians is nearly equal, and leads to a one-layered blastula, of which one-half flattens, then invaginates. By this means there is formed a gastrula which comes nearest of all Ascidians to the primitive type,—i.e., to a Archigastrula. In the *social* Ascidians a modification is brought about in that the blastula is not formed. With the disappearance of the latter the segmentation-cavity is reduced to a split between the embryonic cells, or fails completely. The result of segmentation is a two-layered plakula, into which the elements of the two germ-layers differentiate quite early,—at the eight-celled stage. The gastrula is here formed not by invagination of blastoderm cells, but by a splitting in the endoderm, while the borders (periphery) of the plakula rise up and grow towards one another,—a process that is brought about by unequal growth (increase).

of the cells of the two germ-layers, and is to be distinguished from the true invagination (embole) as pseudoembole.

"The development of the *compound* Ascidians is easily distinguished from that of the social Ascidians. Here the plakula turns in by another process, since the gastrula-cavity (which formed the archenteron in *Clavellina*) is filled in the dorso-ventral direction with dividing endodermal cells. Now the archenteron arises neither by embole or by pseudoembole but by delamination of the large endodermal cells (*Distaplia amarœcum*). The closing over of the endoderm by the ectoderm takes place in *Distaplia* by a different process in different parts of the embryo; anteriorly it is purely epibolic; posteriorly, on the other hand, this takes place by a division of the dorsal endoderm cells (endodermplate), which at the same time, together with the ectoderm cells in question, grows around a space (pseudogastrula-furrow), which space is later filled by the endodermal cells themselves. This process, taking place in the pseudoembolic region of the embryo, must be looked upon as a rudiment of embole, which, in spite of great changes in the egg of social Ascidians, occurs in the typical way."

This series of stages, from the simple to the social, to the compound Ascidian, furnishes an excellent example of Hatchesek's law that "by a phyletic change in a group of animals not only the adults (end stage) are changed, but also the whole series of embryonic stages, from the egg to the adult (end stage.)"

Rabl's phylogenetic classification of the vertebrates according to the accumulation of yolk is criticised and objected to. We need not here enter into the detailed description of the origin of the mesoderm, the digestive tract, and the notochord, which occupies the last fifty pages of the paper.

Development of the American Lobster.—Two preliminary papers, one on the habits and larval stages of the lobster, and the other on the reproductive organs and early stages of the lobster, have been published by Prof. F. H. Herrick.³ "The spawning season is confined to the summer months, and the eggs which are then laid are carried by the female throughout the fall, winter, and spring, and are not hatched under natural conditions until the following summer." The number of eggs laid varies from about 3,000 to 36,000; a lobster 10½ inches long produces on an average 12,000 eggs. The lobster does not breed annually. The eggs laid in summer develop with comparative rapidity, and eye pigment is formed in 27 to 30 days. Development slows up in the fall, and comes nearly to a standstill in the

³ Johns Hopkins University Circular, No. 87, 1891.

winter. Soon after hatching a brood the lobster may moult, but eggs are not laid again until at least another year.

When the young lobster hatches from the egg it moults, and in artificially hatched lobsters large numbers die on account of inability to pass this moult. After six or seven days the second moult occurs. Young lobsters swim at the surface six to eight weeks, and then disappear entirely from the surface.

The second paper deals with the growth of the reproductive organs, and the stages as far as the nauplius-like condition. The greatest differences appear in the segmenting eggs. The egg nucleus, with its surrounding protoplasm divides near the center of the egg, and its products wander to the surface, and the periphery breaks up into irregular cells. Until about 40 hours after fertilization the peripheral yolk is entirely segmented. About 30 segments are present. In all the segmentation stage occupies three days. By the end of the fourth day the invagination stage is reached. This is followed by the keel stage, which lasts about four days. At the beginning of the tenth day the nauplius appendages begin to bud, first the first pair of antennæ and mandibles together, and a little later the second pair of antennæ.

ENTOMOLOGY.

The "Arrow Weed" and Mexican "Jumping Bean" Insect.—It has long been known that the Indians in Mexico make a powerful poison from some native plant, which poison, in a milder form, is also used as a cathartic. It has also long been known that seeds possessing the curious power of jumping are produced upon the same plant in Mexico, and are sent to other parts of the world, forming quite an article of commerce. The exact nature of this plant, however, has hitherto remained a mystery. At a recent meeting of the Washington Entomological Society, Professor C. V. Riley read an interesting paper on the determination of the plant upon which these "jumping seeds" are produced. In the Transactions of the St. Louis Academy of Sciences for 1875 is an account of *Carpocapsa saltitans* Westwood, the insect which causes the saltation of the "beans," he had called attention to the fact that the particular euphorbiaceous plant upon which these seeds are produced was not determined. Westwood, in his original description of *Carpocapsa saltitans*, states that the plant is known to the Mexicans as Calliguaja, and in a recent